DOCUMENT RESUME

ED 410 476 EA 028 410

TITLE Facilities Guidelines. North Carolina Public Schools.
INSTITUTION North Carolina State Dept. of Public Instruction, Raleigh.
PUB DATE Jan 97
NOTE 47p.
PUB TYPE Guides - Non-Classroom (055) -- Legal/Legislative/Regulatory Materials (090)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Design Requirements; *Educational Facilities Improvement; *Educational Facilities Planning; Elementary Secondary Education; *Facility Guidelines; *Facility Requirements; *Public Schools; School Buildings; School Construction; School Space; Space Utilization; State Legislation; *State Regulation
IDENTIFIERS *North Carolina

ABSTRACT

In July 1987, the North Carolina General Assembly enacted legislation to provide funds for public school construction to assist county governments in meeting their capital building needs and to provide additional funds for selected counties with the most critical school facility needs. This document, in accordance with the legislation's direction, defines and describes the educational spaces needed to support a modern, comprehensive educational program and to set minimal guidelines for types of spaces and for sizes of spaces. The handbook serves as a planning guide for those in the process of building, enlarging, or renovating school facilities. The document is also intended to serve as a guide in: (1) evaluating existing facilities for functional adequacy; (2) determining facility needs; and (3) in developing sound, long-range building plans. The appendix contains design requirements, facility guideline forms, and copies of state statutes. (LMI)

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North Carolina Public Schools

Facilities Guidelines

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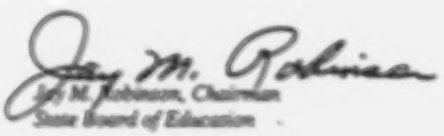
FOREWORD

The responsibility for providing public school facilities in North Carolina rests with the counties and the special chartered school districts within them. State support for school construction has been provided through state bond issues in 1949, 1953, 1963, 1973, and 1996 when it became apparent that local resources could not keep pace with growing facility needs. Local boards of education, which are the legal owners of school facilities, are responsible for planning and erecting appropriate facilities to support instructional programs.

The "Finance Act of 1987" established the North Carolina Public School Facility Standards. In August, 1996 the North Carolina General Assembly enacted legislation which directed that these facility *standards* become facility *guidelines*. It further directed the State Board of Education to appoint the Public School Facilities Task Force to review and make recommendations for revision of the guidelines, which define and describe minimum facilities to ensure educational program appropriateness and long-term cost efficiency. The Task Force comprised educators, facilities management professionals, design and engineering professionals, and representatives of the North Carolina County Commissioners and School Boards associations and the State Treasurer's office. This publication, approved by the State Board in January, 1997 reflects the conclusions of the Task Force.

The North Carolina Public School Facility Guidelines has been developed to provide school systems and designers with useful and reliable design information to use as a basis for new schools, additions and renovations. We believe that these guidelines will enhance the ability of local school systems to plan effective and efficient facilities which maximize instructional opportunities for students. It is our hope that these guidelines provide strong direction for school design, while maintaining local control of that process.



Jay M. Robinson, Chairman
State Board of Education

Michael E. Ward, State Superintendent
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Note: Additions and changes from the previous edition are shown herein as **underlined and bold.**

PURPOSE

In July 1987, the North Carolina General Assembly enacted legislation to provide funds for public school construction to assist county governments in meeting their capital building needs and to provide additional funds for selected counties with the greatest critical school facility needs. The legislation follows the state's Basic Education Program, which assures every child in North Carolina "a program of instruction which is fundamentally complete and which will provide a thorough grounding in...the arts, communication, media and computer skills, second languages, healthful living, mathematics, science, social studies and vocational education."

This document, in accordance with the legislation's direction, defines and describes the educational spaces needed to support a modern, comprehensive educational program and to set minimal guidelines for types of spaces and for sizes of spaces. Consequently, it serves as a planning guide for those in the process of building, enlarging, or renovating school facilities. Administrators, teachers, lay persons and design professionals will find the document helpful as they plan and design educational spaces.

The document is also intended: (1) to serve as a guide in evaluating existing facilities for functional adequacy; (2) to determine facility needs; and (3) to develop sound, long-range building plans. Consequently, it includes guidelines and recommendations for improving facilities. The guidelines set forth in this document do not preclude or take precedent over existing laws and codes defined and enforced by other agencies.

All plans for new construction and renovations must have approval and specific permits from the appropriate state and local agencies.

These reviews, permits and approvals are issued by agencies which include the following:

- *State Department of Labor:*
  Approval of elevator installations.

- *State Department of Insurance:*
  Compliance with the North Carolina State Building Code.

- *NC Dept. of Environment, Health, and Natural Resources:*
  Approval for new on-site water systems.
  Approval of on-site waste water.
  Approval of kitchen sanitation.
  Approval of soil sedimentation and erosion control plans where one acre or more is to be disturbed.

- *State Department of Agriculture:*
  Approval of propane gas installations.

- *State Board of Education* G.S. 115C-521 (see Appendix)

The North Carolina School Facility Guidelines are recommended *minimums* and should not be construed as averages or as standards. Although intended to assure adequacy, guidelines can sometimes be restrictive to the efficient design of a facility. In an attempt to avoid such inhibiting restrictions, the guidelines do allow minor deviations in spatial requirements where design efficiency dictates. Such flexibility is essential to good design but cannot be allowed to become a means of lowering guidelines. It should be understood that, in certain circumstances, some guidelines will not be appropriate or cannot be met due to atypical programs or special conditions. Also, many older, existing facilities will not meet many of the guidelines and the cost of renovations to bring them into compliance may be prohibitive.

Phased construction is often necessary and appropriate. When a space to support the program is not provided, due to either a lack of funding or for other reasons, **show it on the plans as a future phase of construction.**

Small schools may be unable to meet the guidelines, as multipurpose spaces may serve for specialized needs such as dance, theater arts or workforce development (vocational) labs. Multipurpose spaces must be designed so that the room, furniture, equipment and storage are compatible with the intended programs. The intent of the guideline is to assure that adequate space is provided for those classes and activities that make up instructional programs as indicated by the North Carolina Standard Course of Study. Where single spaces can adequately provide for multiple uses, the guideline will be considered met.

The facility guidelines do not replace the need for educational specifications. Educational specifications should be developed which describe the educational program to be implemented. **Instructional staff should be involved in the development of educational specifications and the review of facility design.** From educational specifications, the planners should be able to determine the unique spatial needs to support an individual program and which spaces can serve several activities or functions.

A permanent record of deviations will be prepared for each project which differs substantially from these guidelines. Copies of this list will be forwarded to the local Board of Education, the designer, and placed in the permanent file for that facility. This information will be reviewed quarterly by the State Board of Education.

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LONG-RANGE PLANNING

The School Facilities Finance Act of 1987 requires local boards of education to develop long-range organizational and facility plans. Specifically, the legislation states, "Local boards of education shall submit their long-range plans for meeting school facility needs to the State Board of Education by January 1, 1988 and every five years thereafter." To develop a long-range plan, which includes efficient utilization of existing facilities, priorities for new construction and renovation, cost estimates, and estimates of available resources, a board of education must address the following five questions:

- How many schools are needed?
- Which grades will they serve?
- How many students will they accommodate?
- Where will they be located?
- Which students will they serve?

In the 1950's, most rural school systems were organized to serve grades 1-12 or 1-8 and 9-12, while schools in urban areas were generally organized to serve grades 1-6, 7-9 and 10-12. In recent years, there has been a significant movement toward a middle school plan of organization across the state. A typical organization based on the middle school concept serves grades K-5, 6-8 and 9-12, but organizational patterns with schools for grades K-4, 5-8, 9-12 or K-6, 7-8 and 9-12 are not uncommon.

While the movement toward a middle school plan of organization has been substantial, other organizational patterns still exist. Alternative plans of organization will continue to be appropriate in some communities because of existing facilities, natural geographic boundaries, sparsity of students, road patterns, and travel times and distances. The Department of Public Instruction and the State Board of Education do, however, believe that a three-tier plan of organization which allows a specifically designed program for students in the middle grades is desirable and that a grades K-5, 6-8 and 9-12 plan of organization is preferable. The state curriculum and the Basic Education Program are designed around this organization. Local boards of education should continue to evaluate their organizational patterns and work toward this structure where feasible.

Several school systems in North Carolina now have programs for three- and four-year-old children. This trend is expected to continue and is encouraged. For some school districts, programs for pre-school children will be more appropriately located in neighborhood centers; for other districts, these programs might be located on the campuses of neighborhood schools. Consideration should be given to housing three- and four-year-old children as boards of education develop long-range plans for possible reorganization and new facilities.

Boards of education are also encouraged to study the issue of optimal school size. As with grade structure, local conditions may require differences in school sizes, with schools which are smaller or larger in membership than the optimum.

Boards of education are urged to keep abreast of educational trends which affect the design of school facilities. Center-oriented instruction is being seen in the upper elementary grades. Team organization for each grade level in middle schools may vary and elements of center-oriented instruction may be present. There is some interest in dividing the students within a high school into academic houses or pods.

Boards of education are encouraged, however, to continue studying this issue and to strive for schools which are large enough to offer a comprehensive program and student services at a reasonable cost, yet small enough to offer a personal, caring atmosphere.

The Department of Public Instruction and the State Board of Education believe that elementary schools ranging from 450 to 700 students; middle schools ranging from 600 to 800 students; and high schools ranging from 800 to 1,200 students can offer an excellent educational program, including a comprehensive curriculum, **but middle schools of 1,000 students and high schools of 1,600 students are not uncommon.** . The board also believes that schools of these sizes can offer the most efficient use of space and personnel at a reasonable cost per student without losing personal contact with and among students. As with grade structure, school size must ultimately be determined by factors such as existing facilities, areas of population density, natural geographic barriers, road patterns, transportation times and distances, and local preferences.

The Department of Public Instruction **no longer routinely** conducts **comprehensive** surveys for local school systems to help local boards develop long-range plans. **Such surveys can be conducted by private consultants or by the school system's own staff (with guidance from School Planning) and can provide** an evaluation of and recommendations for school organization and facilities. **Limited studies and evaluations may be performed when staff can be allocated,** and are available without cost upon request.

Grades	Guidelines "Developable Acreage"
K-6	10 + 1/100 ADM
5-8	15 + 1/100 ADM
7-9	20 + 1/100 ADM
9-12	30 + 1/100 ADM

The above may not be attainable in urban and certain other areas of the state. In these cases, innovative solutions for parking, physical education facilities and other site amenities may be required. School Planning will assist representatives of the local school unit in determining if the site will be functionally adequate.

Traffic **Guidelines**

Drives which completely circle a building, or have to be crossed when going from building to building or playground, **are hazardous and should** be avoided. Parent auto traffic and bus traffic **should** be separated once on the school site.

Power Lines Recommendation

Avoid locating facilities near electric power transmission lines. All site functions (except entry drives) and facilities **should** observe the clearances noted in **The School Site, Land For Learning.**

Site Evaluation Recommendations

These factors should be used for evaluating existing or potential school sites:

- Location (bus and auto routes)
- Size (number of acres; road frontage)
- Shape (rectangular 3:5 ratio preferred)
- Topography/Drainage (usable acreage)
- Access (separate traffic types on site)
- Traffic (buses; cars; pedestrians)
- Soil conditions (foundations; waste disposal)
- Plant life (trees; bushes)
- Noise/Air pollution (airport; traffic; industrial)
- Utilities (availability)
- Television signals (ETV; school TV)
- Security/Protection (emergency access; lighting)
- First cost (cost per acre)
- Developed cost (actual cost)

Other Planning Resources:

School Planning, **The School Site, Land for Learning,** October 1994

Comments and Recommendations

The acreages refer to usable **(land which can be developed)** land. **Purchase additional acreage to account for areas that cannot be built upon, such as steep slopes, wetlands, rights-of-way, easements, setbacks, buffers or poor soils.** If on-site water or sewer is required, substantial additional acreage may be needed.

A high school may need an additional area of 10 acres or more if a stadium and spectator parking are anticipated.

Pre-kindergartens and kindergartens should have a separate shared play area. Fencing may be necessary for safety or control for kindergarten play areas, but fencing is required for pre-K **by the NC Day Care Standards**. Fences or walls cannot exceed 32" if there is a locking gate.

All grade levels should have paved activity areas.

The number and types of physical education fields depend on the size and grade structure of the school. Guides for athletic fields may be found in **The School Site, Land for Learning** publication.

Natural features of a new school site should be considered for their potential contributions to the teaching of science. Natural areas suited to the teaching of biology and earth science classes should be preserved in a landscape plan.

Handicapped accessibility to all site functions, including athletic facilities, is required **by the North Carolina State Building Code and the Americans with Disabilities Act (ADA)**.

Pedestrian traffic in auto and bus areas **should** be carefully studied. Safety on the school site will carry the same importance as building safety in the **review** process.

On-site parking needs have increased greatly. Spaces for all staff, itinerant specialists, and an additional 10%-20% for visitors should be provided. Student parking for high schools should be provided for a third or more of the student population.

REGULAR CLASSROOMS

Grades	**Guidelines** Net Square Footage
Pre-K (3 & 4 yr. olds)*	1,200-1,400
K*	1,200
1-3*	1,000-1,200
4-8	850-1,000
9-12	750-850

Include an additional 15-20 square feet for each separate computer workstation when provided within the classroom.

***Some school systems have experimented with substantially reduced class sizes (18 children or less). In these cases, it may not be appropriate to include as many learning centers within the classroom. School Planning will assist local administrative units to evaluate spatial needs for these situations. Because of the need for shared space and amenities within each classroom, square footage per student ratios are not useful.**

Ceiling Heights Room Size	**Guidelines** Ceiling Heights
850 sq. ft. or less	9'-4"
851 sq. ft. or more	10'-0"
Mobile classrooms	8'-0"

Windows **Guidelines**
Grades

All classrooms should have windows for rescue, light, ventilation, and psychological reasons.

K-5 Classrooms should have windows equal to or greater than 8% of the floor area.

6-12 Classrooms should have windows equal to or greater than 6%-8% of the floor area..

9-12 No more than 20% of the total number of teaching stations **should** be windowless.

Every classroom shall have at least one outside window which can be used for emergency rescue or ventilation, unless an exterior door is provided. The window shall be operable from the inside and provide a minimum clear opening dimension of 24 in. and 5.7 sq. ft. in area. Maximum sill height shall be 32 in. (K-6) and 44 in. (7-12). Windowless classrooms shall provide secondary access (through an adjoining classroom or directly) to an exit corridor which is separated by one-hour rated construction from the primary exit corridor. (N.C.S.B.C. Volume I, section **1021.1.2** . See also GS 521C 115.

Comments and Recommendations

The net square footage of a pre-K room should not be less than 1,200 sq. ft. The net square footage of a kindergarten or first grade classroom should not be less than 50 sq. ft. below the **guidelines.** Recessed doors, toilets, coat closets, offices, and storage rooms are not included in the net instructional area for pre-K through first grade.

To avoid the expense of a second exit door, 1-3 grade classrooms may be 980 net sq. ft. This does not include storage rooms, teacher offices or wall thickness.

Classrooms should be equipped with computers or conduits for future installation.

Classrooms should be equipped with a two-way communication system for informational and emergency use.

Classrooms smaller than 1,000 square feet should not exceed a 3:2 length-to-width ratio. **Because of problems with sight angles and distances,** the minimum classroom width should be 24'. Individual toilets for pre-K-1 classrooms may be paired with adjoining classrooms to provide a boys' toilet and a girls' toilet. Individual toilets for the first grade **may be** used to provide flexibility.

Heat-producing appliances, such as ovens or ranges, in pre-K through grade 5 classrooms are **hazardous and should not be installed.** A separate cooking center (local option) will not be included in the classroom net square footage. Heat-producing appliances and counter outlets in instructional kitchens **should** be on a "kill switch" with a power-on light, located out of reach by students.

Twenty percent (20%) of a room's ceiling may be lower, provided the North Carolina State Building Code minimum is met.

State legislation requires the local board of education to consider the placement of windows to take advantage of the climate of North Carolina for both light and ventilation.

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Cabinets
See design information (Page 26)

Cabinetwork should include file drawers, box drawers, wide drawers for poster paper, vertical slots, some open-front bins and a minimum of "kitchen" type cabinets. Wall units should be 60% open shelving for books and displays and 40% door cabinets. Tall reach-in cabinets are preferred for teaching supplies. Provide one section for hanging teacher coats.

Wet Areas

Guidelines

A wet instructional area is required **by the instructional program** in grades K-3 and in grades 4-6 when science is taught in the classroom. See design information on page 30 for counter heights.

Wet areas should include a sink mounted in a countertop for instructional use. The location of the sink should allow maximum student participation. Wet areas are also recommended for middle grades. Hot water in most classroom wet areas is not recommended **due to high cost of installation and operation**. The Pre-K **educational program requires** warm water, and it is recommended for kindergarten.

SCIENCE

Science Grades	Rooms	Guidelines Square Footage
6-8	Science	1,000-1,200
	Combination Math/Science	1,000
9-12	Physical Science	1,200
	Biology	1,200
	Physics	1,200
	Earth Science	1,400
	Chemistry	1,500
	Multipurpose Science (if required)	1,500
9-12	**Biology, Chemistry, Physics Storage/Prep Rooms**	**250 per 2 labs**

Windows		Guidelines
K-12 windows	Project and Science rooms **should** have	

Ceiling Height	Guidelines
	10'-0"

Gas Outlets	Recommendations
Do not provide gas outlets in science rooms where not required by the program. Middle/junior high science rooms should have gas only to the teacher's demonstration table. Gas installations must include master cut-off valves and must comply with other safety code requirements.	

Eye Protection/Showers	Guidelines
Classroom/lab areas where OSHA requires eye protection	Safety goggle cabinet **and** eyewash fountain
Chemistry labs	Add emergency deluge shower

Comments and Recommendations

When a middle school grade level has paired teams for language arts/social studies and math/science, there should be a 50% mix of each type of room for that grade level. For four-teacher teams, **(language arts, social studies, math and science) one-fourth of the classrooms should be science rooms.**

A multipurpose science room is appropriate in small high schools where the enrollment does not justify separate specialized science rooms.

Sufficient work areas with sinks should be provided. Storage and teacher preparation rooms can be shared (square footage is not included in minimum size requirements). Darkrooms can be shared with the art and workforce development (vocational) programs. A 1,500-square-foot chemistry room includes a lecture area and work stations.

Twenty percent (20%) of the room's ceiling may be lower, provided the North Carolina State Building Code minimum is met.

Access to a large-group instructional area, auditorium or teaching theater with AV capability is needed for special lectures.

Classrooms and labs should be equipped with a two-way communication system for informational and emergency use.

Fire extinguishers should be located in each laboratory area.

Chemistry labs should be equipped with fume hoods. For most labs, a low-volume exhaust fan that is controlled by the teacher is recommended. The fan will maintain a slight negative air pressure in the room and prevent the spread of odors to other parts of the building.

SMALL-GROUP ROOMS

Rooms	Recommendation Square Footage
Remediation & resource labs	450

Ceiling Height	**Guidelines**
Rooms	Ceiling Height
Remediation and resource labs	9'-4"

Windows **Guidelines**

Windows are required by North Carolina State Building Code for all rooms subject to student occupancy to the same extent as for regular classrooms.

Recommended where possible for smaller spaces. For certain conditions, a second exit is allowable.

Comments and Recommendations

One or more small-group classroom(s) should be provided for remediation, conferences, guidance, testing, etc., for groups of up to twelve. Some smaller rooms may also be needed in addition to the 450-square-foot rooms for smaller group activities.

Storage space for various instructional materials and equipment should be provided.

EXCEPTIONAL CHILDREN

EXCEPTIONAL CHILDREN SELF-CONTAINED:

Rooms — **Guidelines**
Square Footage

Typically 8 to 12 students will require a minimum of 100 sq. ft. each.

Additional support spaces may be necessary depending upon the program (see comments and recommendations).

EXCEPTIONAL CHILDREN RESOURCE:

Rooms — **Guidelines**
Square Footage

(See small-group rooms.)

Wet Areas — **Guidelines**

Wet area requirements are the same as for regular classrooms except certain programs will require an instructional area with water in both classrooms and resource rooms.

Ceiling Heights	**Guidelines**
Room Size	Ceiling Heights
850 sq. ft. and less	9'-4"
851 sq. ft. or more	10'-0"
Mobile classrooms	8'-0"

Comments and Recommendations

Programs for exceptional children vary greatly, depending on local factors. Spaces **should** be planned to accommodate programs identified in educational specifications. Local factors often result in spaces which are larger than the minimum **guidelines**.

Spaces for exceptional children should be integrated into planned areas for other programs.

If resource rooms are clustered around a shared common area, they may be smaller.

Care should be taken to ensure that the characteristics of fluorescent lighting do not adversely affect children with certain disabilities.

Certain programs serving exceptional children may also require **specialized support spaces, such as** cooking areas, toilets, bath/shower rooms, laundries, **and observation rooms, and special equipment to accommodate certain disabilities**. **The type and extent of these support spaces will vary significantly, depending upon the exceptionality of the children being served.** Minimum requirements for handicapped accessibility as outlined in the North Carolina State Building Code may not be adequate for special education programs. Warm water is required.

Wet areas should include a sink mounted in a countertop for instructional use. The location of the sink should allow maximum student participation. Storage designed for instructional supplies and student projects should be in this area. Coat and book storage may be located elsewhere.

Classrooms for hearing impaired programs will require special acoustical treatment of the finishes, the mechanical system and possibly the lighting ballasts.

Classrooms should be equipped with a two-way communication system for information and emergency use.

Music Rooms	Guidelines
Grades	Square Footage
K-6	
General Music	850-1,000
6-8	
General Music	850-1,000
Vocal	1,000-1,200*
Instrumental	1,000-1,200*
9-12	
Vocal	1,000-1,500*
Instrumental	1,600-1,800*

* This space may be small; study carefully. **Some references recommend 10-18 square feet per singer for Vocal Rooms (more if choreographed) and 25-35 square feet per student for Instrumental Rooms. Class sizes for these programs are often large; 40-90 students or more are not unusual.**

Support Spaces	Guidelines
	Square Footage
Instrument storage room (varies with enrollment)	400-600
Instrument Lockers along music room wall (Increase main room-no separate storage room)	200-300
Music Library	200
Instrument Repair	150
Office (each)	150
Uniform Storage	Varies
Practice Room	55-60
Ensemble Practice Room	150-200

Wet Areas	Guidelines
Workroom	

A sink adequate for cleaning brass instruments is required by middle and high school band programs.

Ceiling Heights	Guidelines
Room Size	Ceiling Height
900 sq. ft. & less	9'-4"
900-1,000	10'-0"
1,000-1,200	12'-0"
1,200-1,800	14'-0"-18-0"
over 1,800	16'-0"-18'-0"+

High ceilings in music spaces dramatically improve acoustics.

Comments and Recommendations

The elementary music room should be designed to accommodate general, vocal and instrumental music. Acoustical treatment is essential and windows are recommended. In smaller elementary schools, spaces to accommodate music plus other programs may be combined into a multipurpose area.

A single music room of designated size is appropriate for small middle schools. Separate rooms **for band and chorus** may be required as enrollment increases and when programs are offered simultaneously.

The room sizes indicated here do not include program support rooms such as offices and storage. These areas are listed separately.

Band instrument and orchestra instrument storage areas should be separate.

Rooms should be equipped with a two-way communication system for informational and emergency use.

Acoustical treatment for vocal and instrumental rooms should be provided. Some flexibility for adjusting the extent of absorptive and reflective surfaces should be provided. Many schools have had good success with acoustic control by providing a "Cash Allowance" in the construction contract for acoustic treatment to be installed after the room is in use.

The minimum ceiling heights relate to flat-floor rooms. Risers are not necessary, but rooms with risers will need ceiling heights adjusted to the highest riser so that appropriate ceiling height and room volume are achieved.

At least one handicapped station within a row of regular seating will be provided in accordance with the North Carolina State Building Code.

Provide an oversized door or pair of doors into the music classroom and instrument storage room.

ARTS EDUCATION - VISUAL ARTS

Art Rooms	Guidelines
Grades	Square Footage
K-8	1,000-1,400
9-12	1,200-1,500

Support Spaces	Guidelines
K-12	
Kiln/Clay Storage	40-60
Art Material Storage	80-150

For fire safety and air quality, place kilns in a separate room with proper ventilation and exhaust. Do not locate in a storage room other than one used for clay products and projects.

Ceiling Height	Guidelines
K-12	10'-0"

Windows	Guidelines
K-12	An art classroom **should** have windows.

Incandescent task and display lighting should be switched **separately** to avoid use as general illumination.

Comments and Recommendations

During the preliminary design phase, the furniture and equipment plans should be developed showing studio and lecture relationships. Storage cabinets and shelving with flexibility are needed for a variety of supplies and projects.

In small elementary schools, the visual arts program may be in a project room, i.e., art, science, crafts, etc.

The ceiling height may vary; however, the average height should not fall below the minimum **guidelines.** The minimum ceiling height **may be reduced** if the art room is the only space in the building or addition requiring more than a 9'-4" ceiling.

Light sources may vary from daylighting to artificial sources. Artificial light sources should provide full color spectrum and task-level illumination. Skylights, clerestories and rooftop light monitors are **possible alternate daylight sources**. Outside work patios adjacent to classroom exterior windows and doors are recommended. Fluorescent fixtures are recommended; however, incandescent may be used for critical tasks where color is important. Provisions for darkening part or all of the room may be a design consideration.

Kilns have special electrical and ventilation requirements that should be provided for, even if the equipment is not in the contract. Paint spraying and hazardous material storage will be subject to the North Carolina State Building Code. Do not locate kilns adjacent to storage areas for flammable materials.

Rooms should be equipped with a two-way communication system for informational and emergency use.

Grades	Guideline
K-12	Square Footage
	1,800-2,000

Ceiling Height	Guidelines
K-12	10'-0"

Comments and Recommendations

The K-6 theater arts room should be a large open space which is carpeted and acoustically treated. A small raised space with simple, individually controlled directional lighting is required for the presentation and viewing of special projects. Design features such as built-in furniture should be avoided in order to provide maximum flexibility.

The middle and junior high theater arts room should be similar to the elementary room. If no other performing facility is available in the school, then this space may be designed as a small teaching theater where both instruction and performance can take place. In either case, there should be a small, raised performance area with simple, individually controlled directional lighting.

In smaller elementary schools, spaces to accommodate theater arts plus other programs may be combined into a multipurpose area. Multipurpose spaces for middle and junior high schools should be evaluated on an individual basis.

The high school theater arts room should be a large, open space for activity-based instruction. It should have a small, raised space with individually controlled directional lighting. The raised space is not essential where an adequately equipped performing facility is nearby and accessible during theater arts instructional time. If a small teaching and performing facility is available for all theater arts instruction, then a separate theater arts room may not be necessary.

ARTS EDUCATION - THEATER ARTS - AUDITORIUM

Grades	Guidelines Seating Capacity
K-8	Not Recommended
9-12	1/3-1/2 ADM (8 s.f./seat)
9-12 Auditorium Support Spaces	**Square Footage**
Stage, Storage & Dressing Rooms	3,000-5,000
Light Lock Vestibule, Lobby, Concessions	800-2,000
Toilets	As Req. by Code
Scene, Costume, Shops	Provide where extensive drama program is offered

By locating band, chorus and drama classrooms adjacent to backstage areas, these spaces can serve double duty as staging, green room, dressing and set-up areas during large performances.

Consideration should be given to allow relamping and/or changes in lighting levels and types without major effort or reconstruction. Stage lights are costly and the amount and types needed vary by the types of performances. Consider the purchase of minimal lights with circuits and grid for installation of rental units.

Comments and Recommendations

If the board of education chooses to build a high school auditorium, consideration should be given to seating the largest class (ADM) x 8 sq. ft. plus about 4,000 square feet for the stage, storage and a small lobby. The auditorium should be planned as a theater, with suitable acoustical design, lighting system, sound system, storage, and support facilities such as make-up and scenery construction spaces. The entire facility should be designed for theater arts instruction, although this will be a multipurpose space. Adjacent study and work spaces should be available to support and provide instruction in theater history, literature, design, construction, acting, directing and performance. These support spaces could be unscheduled regular classrooms.

Rooms should be equipped with a two-way communication system for informational and emergency use.

Large, joint school/community-use auditoriums are discouraged. Large auditoriums are much more costly per square foot due to increased volume, structural spans and special building code requirements (especially if 1,000 or more seats). Generally, multiple performances to smaller groups are more successful than single performances to a large group.

The need for a separate control booth has diminished in recent years. Handicapped accessibility to these spaces is often difficult and costly. Generally, provisions should be made to set up a sound/light control board in the middle of the seating area.

Generous side stage areas are encouraged for prop, scene storage and staging. Flylofts and working stages are discouraged due to very costly building code requirements and hazardous conditions for children handling heavy weights and working at great heights unsupervised.

Orchestra pits are strongly discouraged for safety reasons and because members of a student orchestra are a part of the performance and should be visible to the audience. As an alternative, provide several rows of removable seats at the front of the auditorium to provide space for an orchestra.

Consideration should be given to providing overhead or oversized doors from a loading area to the stage and scene storage areas for moving large props and scene sets.

Handicapped ramp accessibility to the stage in which the individual need not leave the auditorium is highly desirable.

ARTS EDUCATION - DANCE

Grades	Guidelines Square Footage
K-8 Combined Dance/Drama (Incl. 100 sf storage/program)	1,800-2,000*
9-12 (Incl. 100 sf. storage)	**1,800-2000***

***In smaller elementary schools, spaces to accommodate dance plus other programs may be combined into a multipurpose area. Multipurpose spaces for middle and junior high schools should be evaluated on an individual basis.**

***In small high schools, theater arts and dance may be combined, provided the design and additional support space required demonstrate functional adequacy.**

In high schools, dressing rooms and access to showers is desirable. Where located close to the gymnasium locker rooms, this space can be combined. Otherwise, provide 200-400 square feet for this function adjacent to the dance room.

Ceiling Heights	Guidelines
	10'-0" Minimum 12'-0" recommended **(High ceilings are necessary where dancers perform lifts.)**

Windows	Recommendations
	Recommended where possible

Comments and Recommendations

The dance classroom should be a large, unobstructed space with either a suspended wooden floor or a floor covered with a portable or permanent dance surface which provides a resilient surface on which to move. Many wooden gymnasium floor systems are not resilient enough for thin dance shoes or socks. Dance classrooms should not be carpeted or have only a concrete and/or tile floor. It may be desirable to have mirrors on one wall of a shatterproof material or mounted to prevent shattering. An adjustable-height dance barre may also be desirable. The classroom should be soundproofed or located so that music and other noises associated with dance instruction do not conflict with adjacent classrooms. There should be storage and/or closet space for students to use to store their personal belongings during the class. A separate lockable storage space for the dance teacher to store materials, equipment, recordings, props and other related items should be easily accessible. Bulletin boards and markerboards are needed. Storage should be provided for mats or cushions that students sit on while viewing films or during other instructional activities. It is desirable to locate the rooms near toilets and water fountains.

At the middle and high school levels, dressing room space is needed for students to change clothing.

Rooms should be equipped with a two-way communication system for informational and emergency use.

WORKFORCE DEVELOPMENT (Vocational Education)

Workforce Development (Grades 6-8)	**Guidelines** Square Footage
Exploratory Programs:	
Exploring Career Decisions	1,300-1,600
Exploring Life Skills	1,400-1,600
Exploring Technology Systems	1,400-2,000
Exploring Business & Marketing	1,300-1,600
Exploring Biotechnology	1,400-2,000
Skill-Development Program:	
Keyboarding	1,000-1,400
Business Computer Technology	**1,000-1,400**

Workforce Development Classrooms/Labs (Grades 9-12)	**Guidelines** Square Footage

NOTE: HIGH SCHOOL WORKFORCE DEVELOPMENT PROGRAMS ARE CURRENTLY UNDERGOING REVISION. CONSULT WITH SCHOOL PLANNING AND LOCAL AND STATE WORKFORCE DEVELOPMENT STAFF, IN THE PLANNING AND DESIGN OF APPROPRIATE SPACES.

Comments and Recommendations

For middle school programs, local school districts may select from exploratory courses, **Business Computer Technology** and Keyboarding. Smaller schools may combine certain programs in multi-use labs

See **Middle Grades Exploratory Vocational Facilities** for proposed space **Guidelines.**

The Basic Education Program states:
"Vocational Education (grades 7-8) will be available to all students, but not required. A basic high school vocational education program must include offerings in at least three of the following areas:

Agricultural Education
Health Occupations Education
Business Education
Family and Consumer Sciences Education
Marketing Education
Technology Education
Trade & Industrial Education"

Many high schools offer all seven programs. The number and types of laboratories will depend on courses offered locally. More than one laboratory for a program such as family and consumer sciences may be necessary in larger schools.

Career centers serving several schools will affect the types and number of facilities needed at a high school.

Many workforce development programs are moving away from the large and extensively equipped trade and industrial shops. School Planning will review facilities based on new and innovative workforce development programs, as described in the educational specifications developed by the LEA.

Ceiling Heights **Guidelines**

See regular classrooms for workforce development classrooms and light-equipment laboratories up to 1,200 square feet.

1,200-2,000 square feet	12'-0"
2,000 square feet and above	14'-0"

Windows **Guidelines**

See regular classrooms for workforce development classrooms and light-duty laboratories. Laboratories with hazardous equipment **should** have windows, skylights, or some other daylight source.

Comments and Recommendations

Multipurpose workforce development laboratories may be necessary in small high schools. A **lab**-type facility, for example, could serve electrical and metals programs. Multipurpose laboratories should also have a detailed layout to establish functional adequacy. In addition, a multipurpose laboratory should meet the requirements outlined in the Purpose section of this guide.

A larger darkroom with additional storage could serve art and science, as well as the workforce development programs.

A student conference area, office and storage area **should** be provided for cooperative method programs. (Agriculture, Business, Marketing, **Family and Consumer Sciences**, and Trade & Industrial Education)

Laboratories that generate excess dust or other airborne pollution must have an exhaust system as may be required by code, health and OSHA regulations.

If a school store is part of Marketing Education, provide an additional 500 square feet.

Workforce development classrooms without an exterior wall may be windowless if they have windows into a shop or laboratory which has an ample daylight source.

Classrooms and laboratories should be equipped with a two-way communication system for informational and emergency use.

MEDIA CENTERS

Grades		Guidelines
	Spaces	Square Footage
K-12	Main Room (RLV)	4'-6'/student (ADM) but not less than 1,600 See matrix in appendix.
K-5	Support Areas **(See Below)**	1,200
6-8	Support Areas **(See Below)**	1,800
9-12	Support Areas **(See Below)**	2,000
K-5	Video Production Room	300
6-12	Video Studio	400
	Control/Editing	260
	Equipment Storage	80

Capacity	Guidelines
40 students or 10% of the membership (ADM), whichever is greater.	

The size and types of various support spaces needed are dependant upon the size and grade level of the school. Additional information can be found in *"Learning Connections: Guidelines for Media and Technology Programs"* Division of Media and Technology, NCDPI. Some of the typical support areas and their recommended sizes include:

Media Office/Administration	**200 plus 50/add'l staff**
Workroom	**400-600**
Production	**400-600**
Darkroom	**150**
Professional Area	**150**
Conference/Small Group	**150**
Equip. Storage/Distribution/maintenance	**175**
Periodical Storage (If not on CDROM)	**150-250**

Ceiling Heights	Guidelines
Main Room (RLV)	Minimum 12'-0"
Support Areas	9'-4"

Comments and Recommendations

The school's media center should be located on the ground floor, be single story and convenient to all learning areas of the school. The plan arrangement should not result in the RLV room (reading, listening and viewing) becoming a major thoroughfare for student traffic. Convenience to an outside entrance with access to restrooms allows the center to operate after hours and facilitates the delivery of materials and equipment. The media center's location should not preclude future expansion of the facility.

A proposed furniture and equipment plan should be developed during the early design development stage in order to determine functional adequacy. The minimum media collection must be equivalent to a school serving 400 students.

Minimum support areas include offices, work/production rooms, conference rooms, periodical storage, some audiovisual equipment storage and spaces for a professional collection. Audiovisual equipment storage rooms should have a second door leading into a corridor for the convenience of teachers checking out equipment for their classrooms.

Video production areas are sized for consumer-grade equipment.

Many schools no longer include a computer room as part of the media program. The current trend is for the media center to house **media retrieval** head-end equipment to serve computers located in the classrooms **or other labs**. **See the Technology Section of this publication for guidelines on computer labs and infrastructure.**

Elementary schools should have a **group** storytelling area for 29 pupils. **Removable risers (carpeted) are often used. Storytelling pits are discouraged due to inflexibility, safety hazards and problems with waterproofing.**

Varied ceiling heights in the main room (RLV) are desirable as part of an aesthetic, acoustical and lighting strategy.

HVA/C System Recommendations

The HVA/C system should be separately zoned from those parts of the building which are not mechanically conditioned year-round. Special attention must be given to adequate ventilation and humidity control to prevent mold and mildew ***year-round***. Computer hardware and software must be protected from temperature **and humidity** extremes.

Windows Recommendations

Windows are recommended in the main media center room (RLV), but are not recommended for electronic equipment storage rooms. They are recommended in the support areas, but are not necessary if there are windows into the main room (RLV).

Wet Areas **Guidelines**

A large, single, deep-bowl sink is needed for many tasks performed in the workroom.

Other Planning Data From:
·School Planning
·Media and Technology Services

Comments and Recommendations

Lighting controls should be convenient and capable of darkening or dimming specific areas. The RLV should have a switch at the entry to control some general lighting. Electrical outlets (some with surge protection) **and network technology connections** should be coordinated with the furniture and equipment plan. Computer and electronic equipment will require more electrical outlets than required by code. Use fluorescent lighting in most areas. Metal halide lighting may be used in the main area. Incandescent fixtures should be limited to special-effect lighting **in low ceiling areas.**

Windows should neither admit distracting light nor hinder space utilization and should be equipped with draperies or darkening shades.

Intercom speaker(s) should have independent volume control(s).

Consideration should be given to providing a MATV/CCTV system for the school (Specialized satellite instructional television). Provisions should be made to receive the signal from the University of North Carolina Center for Public Television and bring it into the media center workroom.

Handicapped access to the media center must meet the requirements of the North Carolina State Building Code, except that the 32" clear spacing for existing shelving will not apply to renovated or remodeled public schools. The spacing between movable furniture must allow for handicapped access.

PHYSICAL EDUCATION

Rooms Grades	Spaces	**Guidelines** Square Footage
K-6	Multipurpose/indoor P.E. (Play Area)	3,600 **Min.+** **4 sf/pers over 600 pers**
6-9	Gymnasium	Varies
Play area	**50x84 court (62x100 with safety space*) desirable** **42x74 court (54x90 with safety space*) minimum**	
Seating	**400-500 square feet/100 seats**	
9-12	Gymnasium	Varies
Play area	**50x84 court (62x100 with safety space*)**	
Seating	**400-500 square feet/100 seats**	

* Safety space of 6' on each side and 8' on each end of a basketball court **to reduce accidents and injury**

9-12 wrestling (competitive)	3,000
9-12 resistive exercise (weight room)	2,000-3,000

Windows	**Guidelines**

Play areas and gymnasiums **should** have windows or other daylight sources to provide a minimum amount of natural lighting.

Ceiling Heights Grades	**Guidelines** Ceiling Height
K-6 **Multipurpose**	15' **(18' recommended)**

The NC State Building Code will allow an exposed roof structure without fire protection if the structure is at least 20 feet above the floor in "Type II" or "Type IV, 1- Hour" buildings.

6-9 **Gymnasiums**	20'-22' min
9-12 **Gymnasiums**	20'-24' min **(25' recommended)**
Support areas under 850 sq. ft.	9'-4"
Dressing, showers, etc.	10'-0"
P.E. and athletic teaching areas (weight, team, wrestling rooms)	12'-0"

Comments and Recommendations

K-6 indoor P.E. areas should include additional square footage for an office, storage and toilets for boys and girls. Add space if a stage is included. The 6-8 grade gymnasium should include dressing and shower areas, offices and some storage. Assembly and spectator use may require increased size. The 9-12 gymnasium should include space for two play courts, spectator seating, dressing and shower areas, office areas, storage and a lobby. Additional P.E. and athletic facilities may be needed to schedule the program in larger schools.

Although use of showers has declined in recent years, some showers should be provided that can be used for both PE and athletics. To encourage their use and maintain modesty, provide private shower stalls with an enclosed dressing area for both boys and girls. Locker and dressing rooms should be visible from P.E. teachers' offices to reduce vandalism and violence.

An auxiliary gymnasium with a minimum of 3,600 sq. ft. is recommended for **middle** schools with 1,000 or more students. **An auxiliary gym of 6,500 sq. ft. is recommended for high schools with 1,200 or more students.**

A resilient floor finish such as high-density gym carpet is recommended for wrestling rooms and resistive exercise rooms. Resistive exercise and wrestling rooms **should** be located in an area accessible to both genders.

Lay out exercise rooms with 2'-0" clear around extended equipment parts or limbs and allow width for spotters and circulation.

A solid, blank, durable wall is desirable in gymnasiums and play spaces for use as a teaching wall or handball and tennis practice surface.

Windows in physical activity areas should be located to prevent glare. Locker rooms should have a daylight source for safety.

The NC State Building Code requires guardrails at the rear and open ends of elevated seating facilities, including tip-and-roll bleachers, where the seating height exceeds 30".

Twenty percent (20%) of the gymnasium and playroom ceiling may be lower, provided the North Carolina State Building Code minimum is met. All playrooms and gymnasiums are teaching stations and require good acoustics. The ceiling is the best area to treat acoustically.

Rooms	Recommendations Square Footage
Principal	200
Assistant principal (each)	150
Reception area	400
Secretary	150
SIMS K-5	120
SIMS 6-8	150
SIMS 9-12	200
Other student services	200
Workroom/Storage	*200
Conference room	200
Record storage	100
General storage	*100

***Considerably larger amounts of storage space are highly desirable.**

Comments and Recommendations

Sizes and number of spaces will vary according to staffing. Partition construction should allow for flexibility.

An assistant principal is funded by the state when the enrollment reaches **approximately** 700.

At least two unisex toilets are recommended for the administrative staff. Group toilets are appropriate in larger schools or where guidance personnel and teachers also use these facilities. Individual toilets in private offices are inefficient, expensive, and not recommended.

STUDENT SUPPORT AREAS

Rooms Grades	Rooms	Recommendations Square Footage
K-5	Guidance	450
6-12	Guidance	300
9-12	Reception/Career center	varies
K-12	Counselor office	150
K-5	Other student services	150
6-12	Other student services	200
K-8	Health room	200
9-12	Health room	150
K-12	Health room toilet	50

Comments and Recommendations:

Elementary guidance areas serve small-group and individual guidance and should include a private counselor office. Schools with more than one counselor may need additional space.

The 6-12 guidance recommendation is for a small school with one counselor. Larger schools will require additional counselor offices. Depending on the size of the school, the reception area may need to be expanded to handle the number of students who may use catalogs and other materials in the guidance center. A guidance/student services center in a large high school can be in the 2,000-3,000-square-foot range.

The health room may serve the nurse and other medical professionals and as a temporary station for sick students. The health room must be located to allow for easy supervision and must include an adjacent toilet. A vision panel with blinds is helpful for supervision by office personnel.

Rooms designated for other student services may house social workers, psychologists or other health professionals. Student offices may be needed for student publications, student government and student clubs.

A vision panel with blinds in a door or wall should be provided for all guidance or consultation rooms where staff liability issues could arise.

STAFF SUPPORT AREAS

Rooms Grades	Rooms	Guidelines Square Footage
K-12	Group Teacher Office/Planning	80-100 Per Teacher
K-12	Special assistant and itinerant teacher office/work space	80-100 Per Teacher
K-12	Workroom	Varies 300 min. 0.75-1.25 sq. ft./ADM
K-12	Lounge	Varies 300 min 0.5-0.75sq. ft./ADM

Telephones	Guidelines
Faculty use (exclusive of Child Nutrition and Administration)	Every teacher should have access to a private telephone

Staff Toilets

Faculty toilets should be located near classrooms. Teachers must not have to travel over 200' to reach a toilet per the NC Plumbing Code. The minimum fixture count for the staff must be based on Public Office Building Occupancy, not School Occupancy (Table 922.2 North Carolina State Building Code, Volume II) using a count of all permanently assigned and itinerant/visiting staff members plus 10%-15% for short-term growth. The ratio of male and female staff must be considered in the use of Table 922.2. Faculty toilets should have a parcel shelf, a place to hang garments, a full-length mirror, and an appropriate area for grooming.

Comments and Recommendations

Combined or shared areas are recommended for efficient and flexible use of offices/workspaces. Teacher offices/workspaces should be near but not in the classrooms, where feasible. In addition to an appropriately sized desk and ergonomic chair, the workspace should include tables, shelving and storage.

Teachers, like other professionals, should have access to a private telephone, a networked computer, lockable storage, and a work area for planning, contacting parents, etc. Where the teacher has a permanently assigned classroom for their exclusive use, these amenities should be within the classroom. Where several teachers use the same classroom during different periods of the day, a separate teacher workspace containing these amenities should be provided.

Where separate teacher offices are provided, group office areas for four or more teachers are encouraged to promote flexibility and improve space efficiency. Classroom area should not be reduced when separate teacher office facilities are provided.

The efficiency of high schools can be significantly enhanced by providing teacher office/planning areas in an area separate from but near to the classroom. Classrooms can be assigned for use by different teachers for all periods of the day if teachers have a separate space for planning, telephoning and other work.

Workspace dividers should have acoustical treatment which will allow telephone and computer use in combined or shared areas.

Workspace should be provided for instructional, lab, and clerical teacher assistants (one per 285 students in ADM). One office/workspace per projected itinerant teacher plus an appropriate number for volunteers and student teachers is recommended.

One or more centralized workrooms is/are recommended for copy machines, duplicators, specialized computers, and other equipment and supplies which are not typically located in teacher offices/workspaces.

Sizes and number of lounges will be determined by faculty size and building plan. Provide limited kitchenette facilities.

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COMMONS, CIRCULATION AND ENTRIES

Corridor Widths	Guidelines
Serving more than two classrooms	8'-0"
Serving more than ten classrooms	9'-0"
Elementary and middle school major corridors	10'-0"
High school major corridors	12'-0"
Lockers along one wall add	2'-0"
Lockers along two walls add	3'-0"

Commons Size	Recommendations
Grades	Square Footage
7-12	Varies

Entries — Recommendations

Bus rider entries and automobile rider entries should receive equal attention.

Stairs — Guidelines

A single run of stairs should not exceed 8'-0" without a landing. (The North Carolina State Building Code limit which is greater is not satisfactory for schools.)

Toilets — Recommendations

Group toilet entries should have adequate privacy screening that does not depend on doors. (N.C.S.B.C. Volume 1, Principle No. 20; 301.20)

Group toilets for boys should have a minimum of two water closets.

Ceiling Heights	Guidelines
Corridors	9'-4"

Doors — Guidelines

Doors which open into a corridor must be recessed or protected by wing walls so that any part of the door swing does not project into the circulation path more than 7". (Also see 1114.5 NCSBC.)

Except for delivery areas, multiple single doors, rather than double doors, are recommended. Use oversized doors for exceptional children entries, shops, kitchens and music areas.

Comments and Recommendations

Corridors receive a high volume of traffic during class changes in middle and high schools. Wide, generous corridors significantly enhance safety and security.

The minimum corridor width **that should be considered** is 6'-0", except that those within office suites, guidance areas and locker rooms may be 5'-0".

Major corridors serve classroom feeder corridors and/or major spaces such as the cafeteria, media center, auditorium or gym.

During class changes, wide corridors in secondary schools serve a social function better than a student commons. Narrow corridors may amplify unacceptable behavior.

Commons should be designed as a student social center. Location and design of commons are more important than size.

Student entries and areas near the cafeteria are good locations for a commons. Ceremonial and visitor entries can be combined with student entries.

The minimum North Carolina State Building Code width for stairs may not be adequate for two-way traffic in 6-12 schools. Stair widths of 6'-7' are recommended. **More stair towers function much better than very wide stairs for handling traffic during class changes.**

Many schools have reduced social problems and maintenance by eliminating entry doors to group toilets and using screen walls for privacy at entrances. Where vandalism is a problem, reinforced masonry privacy partitions should be used around commodes and urinals. Natural lighting is desirable in all areas. Light switches located in the toilets and corridors should be key operated or located in administration areas or equipment rooms not accessible to students.

Group toilets for each gender with 5 to 7 flushing fixtures are most efficient. The N.C.S.B.C. minimum is 4 fixtures. **Lay-in ceilings are discouraged because of abuse and moisture.**

Group toilets should be located on main circulation paths between classrooms and major support spaces (cafeteria, media center, gymnasium, etc.).

Group toilets **should** be available to students in self-contained classrooms when going to cafeteria, media center, etc.

Covered areas at all exterior doors **and** covered walks between separate buildings **are recommended.**

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Dining Room Seating Area	Guidelines
Grades	Square Footage
K-6	12-14*
5-8	12-14*
7-9	14*
9-12	14*
	Per Pupil dining including 2 square feet for circulation

Dining Area Ceiling Heights	Guidelines
Minimum below 3000 Sq. Ft.	12'-0"
Minimum 3000 Sq. Ft. or above	14'-0"

Serving	Recommendations
	20%-25% of Dining area

Kitchen Recommendations

*The total area for grades K-12 can vary from 856 square feet per 100 meals served to 2,880 square feet per 1,500 meals served.

Lunches Served	Square Footage
100	856
250	1,261
500	1,518
750	1,938
1,000	2,208
1,250	2,566
1,500	2,880

Other Planning Resources:
An Architects Guide to Planning School Cafeteria Facilities, School Planning, NCDPI

Comments and Recommendations

The dining area size is determined by dividing the number of participating children by the number of seatings multiplied by the square footage per pupil (size = ADM ÷ number of seatings x sq. ft. per pupil). A very small school may have one seating. A very large school may have four seatings. For the typical school, three seatings make the best use of cafeteria facilities. A program of continuous serving and seating requires some additional planning and may be most efficient.

These ratios relate to a complete lunch and are a valid basis for any public school child nutrition program which is operated in a self-contained cafeteria. The term "kitchen" includes all the usual support areas needed for preparing food for school children and staff.

The minimum guidelines for child nutrition facilities are based on a traditional program which includes a full-service kitchen and seating to accommodate the entire student body in shifts. The guidelines will not be appropriate where central kitchens or satellite food preparation areas are used. Likewise, the dining room area could be reduced for schools with open lunch periods which do not serve the entire student body. For these atypical situations, the board of education should provide a description of the child nutrition program which must be accommodated. Refer to Public School Laws of North Carolina, Article 17. Supporting Services, Part 2 Food Service, 115C-263 and 115C-264.

BUILDING SUPPORT AREAS

Rooms	Recommendations Square Footage	Comments and Recommendations
Mechanical rooms	Varies	Sizes and locations of support area rooms are determined by need.
Electrical rooms	Varies	
Custodial rooms	Varies	Where mechanical equipment is located on the roof or mezzanine, permanent stairs are recommended.
Storage areas	Varies	
Book storage	Varies	All support areas need ventilation.
General storage	Varies	
Receiving	**Varies**	Louvers in interior doors are not recommended; undercut doors instead.
		A well-ventilated storage area for yard maintenance equipment and combustible materials should be provided. A building separate from the main building is preferred. **A two-hour fire separation is required by the N.C.S.B.C.**
		Adequate space above mechanical equipment for ceiling installation and maintenance should be provided.
		Separate boiler and furnace rooms with 2-hour-rated walls and ceilings, with no openings except to the outside of the building (N. C. S. B. C. 406.2.1.4)
		Adequate illumination for reading mechanical equipment controls and gauges should be provided.

TECHNOLOGY INFRASTRUCTURE

The installation of up-to-date technology infrastructure for use by all students, faculty and staff is encouraged. When funds are not available for the installation of a complete system, it is suggested that the capability to install these systems at a later date be provided by the use of empty conduits and cable trays, allocated space for head-end, file servers and other equipment.

Spaces	Guidelines
Regular/Science Classrooms	add 15-20 sq ft per PC
K-5 Computer/Keyboarding Labs	850 sq. ft.
6-8 Computer/Keyboarding Labs	1,000-1400 sq. ft.
9-12 Computer/Keyboarding Labs	See Business Labs (Workforce Development)
Main Head-End Room	450-800 sq. ft.
Wiring Closets	15-120 sq. ft.

Comments and Recommendations

Full-size personal computers have a significant impact upon regular classrooms in terms of needed instructional space, additional electrical capacity and much higher air conditioning loads. See separate publication *Impact of Technology on School Facility Design* for additional design information.

Many school systems no longer associate computer labs with the media center. When computers are placed within the classroom, separate computer labs are used primarily for teaching keyboarding (usually in middle school), programming language, or business applications (Workforce Development).

The main head-end room contains the main connections for the school network to the outside, as well as the hubs, routers, file servers and other equipment to serve the school network. Racks for VCRs, Laser Disk Players, CDROM towers, etc. may be located here, or portions of this equipment may be located in a support area of the media center.

Current economics indicate that it may be more cost effective to eliminate wiring closets for regular classrooms by running fiber-optic cable from the main head-end room to an eight-station hub located on the computer wall or above the ceiling of each classroom.

When using copper cabling, network connection wiring closets must be located such that no workstation has a cable length of more than 300 feet from this space. A campus plan (separate buildings) school is likely to need a closet for each building. Large, single-story buildings may need a closet for each wing; smaller more compact schools may be able to eliminate these closets altogether and make all connections directly at the main head-end room.

A closet serving only a few connections may require nothing more than a mounting board on the rear wall of a closet for punch-down blocks and hubs. Closets serving large numbers of connections will need space for floor-mounted racks for router and hubs with access to both front and rear, as well as possible file servers and cross connections to telephone or other services.

Integrated Communication Systems combine bells, intercom, television, video tapes/discs, telephone and/or other technology systems. The extent of and requirements for these systems vary widely by manufacturer.

ELECTRICAL AND LIGHTING CONSIDERATIONS

ELECTRICAL SYSTEM VOLTAGES

480Y/277 volt systems (with transformers for 208Y/120 volt uses) should be provided when connected loads exceed 500 KVA. A cost analysis may warrant maintaining the existing voltage system with addition/renovation projects.

SERVICE ENTRANCE

The impact of the short circuit interrupting capacity of the electrical utility at the secondary terminals of its transformer MUST be used when designing service entrance equipment and panels. Consider placing this capacity on a plaque on the main panelboard for future reference.

The use of spare conduits from the utility transformer to the main panel for future growth is recommended.

WIRING SYSTEMS

Copper conductors should be used for feeder circuits from the main panel to its subpanels. Copper clad aluminum wiring for feeder circuits 100 amps and larger can be used if splices and terminations are mechanically crimped.

ELECTRICAL PANELS

Verification should be made that the panels, conductors, and the over-current protection for each is coordinated.

GROUNDING

The proper grounding electrode system should be included with the correct sizes for the grounding "electrode conductors". Connections to ground rods and a second grounding point are required, such as the building steel or metallic water piping in contact with the earth for at least a ten-foot length. This applies to service entrance panels and step-down transformers. Refer to the National Electrical Code (NEC), Section 250. Bonding and grounding diagrams should be included.

ILLUMINATION

See recommended illumination levels in the appendix. Compact fluorescent fixtures should be installed where incandescent fixtures have been used traditionally for wall washing, display cases and down lighting in traffic patterns. Fluorescent lighting fixtures can be installed with equipment used in most desired applications for dimming, but where color rendition and brightness control may be critical, such as drama class settings in auditoriums, incandescent spc lighting fixtures (track lights) may be used.

Incandescent fixtures should be avoided due to high operation cost and short lamp life. The use of electronic ballasts and T-8 fluorescent lamps, metal halide and high pressure sodium lighting fixtures in appropriate locations is strongly recommended.

Light-emitting diodes (LED) exit lighting fixtures are recommended because of their very long life and very low operational cost. Incandescent exit fixtures should be avoided. Locations of exit and emergency lighting fixture are critical. See the North Carolina State Building Code.

ENERGY CONTROLS

The use of remote switches for lighting in corridors, rest rooms, gymnasiums and common areas is recommended. These switches should be located in areas accessible only to designated staff. Key-operated switches are a second choice. All of the lighting systems in a building should be placed on the energy management systems, with motion detectors to turn off lights in non-sedentary spaces if vacant for over 10 minutes. See HVA/C section for other energy controls.

FIRE ALARM SYSTEM

See the North Carolina State Building Code for required locations of fire alarm pull stations and horns. Verify that enough horn/strobe lights are provided for sufficient coverage. Strobe lights are required in rest rooms. Connect ductwork smoke detectors into the fire alarm system and design to shut down the air handling units. Provide connections for the kitchen fire extinguishing system to the fire alarm system and the shunt trip mechanisms to disconnect the cooking equipment and the kitchen hood fans (NFPA).

COMMUNICATIONS SYSTEMS

Thoughtful planning is required to accommodate sufficient numbers and proper locations of computers, telephones, TV, intercom/paging/radio and other integrated communication equipment. For the computer and other high-speed electronic equipment, the backbone can be fiber optic cables with "level 5" copper cables to the individual items of equipment. If connections to the State Information Highway are desired or required, fiber optic cables are required. Isolation transformers, surge suppression and lightning protection

ELECTRICAL AND LIGHTING CONSIDERATIONS (Continued)

devices should be used to protect all electronic equipment and the panels to which they are connected. Sufficient wire ways should be installed and located for ample expansion. Cable tray over lay-in ceilings in corridors is the most common method for routing communications and computer cables.

MISCELLANEOUS

Verify, *with the actual equipment installed*, properly sized circuit breakers, feeders and connections to elevators; mechanical and plumbing equipment such as boilers, chillers, pumps, air handling units, heat tape, fan coil units and water heaters; kitchen equipment such as steamers, ovens, fryers, mixers, dishwashers, booster heater for the dishwashers, exhaust and make-up fans in the hood, fly fans, serving lines, freezer and refrigerator compressors and evaporators; shop equipment and computers, intercom/paging/radio, telephone system, energy management system, intrusion equipment and TV.

Disconnect switches are required for all motors, water heaters and large laundry equipment. Even hand dryers are required to have disconnects as per NEC 422-21(b). The fifty feet and "in sight of" rules applies for all.

ADDITIONAL REFERENCE

A more complete document for the installation of mechanical and electrical systems in North Carolina schools is the MINIMUM CHECKLIST for MECHANICAL AND ELECTRICAL PLANS & SPECIFICATIONS. This publication can be ordered from School Planning.

DESIGN INFORMATION

Work Counter Heights			Guidelines
Pre-K-3	4-5	6-8	9-12
24" to 26"*	30"*	30" to 36"*	33"to 36"

* Handicapped standards for children up to age 12 must be met.

Marker/Chalkboard Rail Heights			Guidelines
Pre-K-3	4-5	6-8	9-12
21"-26"	28"-30"	29"-32"	33"-36"

Plumbing Fixture Mounting Grades	Height (to rim)	Americans with Disabilities Act (ADA) Standards
Water Closets		
K-3	15"	15"
4-6	15"	15"
7-12	15"	17"-19"
Urinals		
K-3	14"-17"	14"
4-6	20"	14"
7-9	22"	17"
10-12	24"	17"
Lavatories		
K-1	24"	28" (24" min. knee space)
2-6	27"	30"
7-12	31"	34"
Drinking Fountains		
K-3	24"	30"
4-6	28"	30"
7-12	34"	34"
Showers		
K-5 Boys & Girls	50"-56"	66" fixed 48" flexible
7-9 Boys	72"	74" fixed 60" flexible
7-9 Girls	60"-66"	74" fixed 60" flexible
10-12 Boys	72"	74" fixed 60" flexible
10-12 Girls	66"	74" fixed 60" flexible

Space Profiles
Upon request, School Planning can provide a computerized space profile for a given enrollment (Pre-K-5, 6-8 & 9-12).

Comments and Recommendations

Construction
School Planning **strongly discourages** new school construction or school additions of type VI construction (N.C.S.B.C.) over one story. Type VI construction is strongly discouraged due to its inherent fire hazard potential and future limitations on expansion.

Ceilings
Lay-in ceilings are most often used and are acceptable. Gypsum board is recommended in small spaces, low-ceiling areas, toilets and dressing rooms, and unsupervised areas. Multipurpose rooms and gymnasiums should have **impact-resistant ceiling or** a cementitious fiber roof deck for proper acoustics.

Walls
Masonry walls are preferred. Gypsum board stud walls require more maintenance. Chair rails and double layering of sheetrock are recommended for increased durability. Stud walls in administration and guidance areas may be preferred for flexibility.

Floors
Primary classrooms should have a good grade of carpet, since many activities take place on the floor. Resilient tile is recommended for other classrooms and for wet areas in carpeted rooms. Multipurpose rooms and gymnasiums should have resilient floors such as wood, synthetic or high density carpet.

Carpeting is **often** desirable in corridors for acoustical control. There should be a separate area of carpet at outside doors so that it can be replaced easily. Terrazzo is often used in corridors when durability is desired.

Lighting
Fluorescent lighting is recommended for general lighting. Incandescent lighting should only be used for limited accent lighting, stage lighting and special art room lighting. Gymnasiums should use metal halide fixtures. Metal halide should be considered in other large-volume spaces.
Fluorescent fixtures should have T-8 lamps & electronic ballasts with three or four tubes, and double switching to control inside tubes separately. Fixtures in dishwashing areas and shower rooms should be **rated for wet locations.**

Handicapped Accessibility Standards
Many provisions of the Americans with Disabilities Act (ADA) are currently under consideration for incorporation into the North Carolina State Building Code.

Each teaching station should have an area that meets the requirements of the North Carolina State Building Code. In regular classrooms, this can be accomplished by rearranging the student work surfaces. Laboratories and other specialized areas may need one station modified for accessibility. Programs for exceptional children may entail design features that exceed the building code requirements.

APPENDIX

GENERAL STATUTE 115C-521. Erection of School Buildings.

(a) It shall be the duty of local boards of education to provide classroom facilities adequate to meet the requirements of G.S. 115C-47 (10) and 115C-301. Local boards of education shall submit their long-range plans for meeting school facility needs to the State Board of Education by January 1, 1988, and every five years thereafter. In developing these plans, local boards of education shall consider the costs and feasibility of renovating old school buildings instead of replacing them.

(b) It shall be the duty of the boards of education of the several local school administrative school units of the State to make provisions for the public school term by providing adequate school buildings equipped with suitable school furniture and apparatus. The needs and the cost of those buildings, equipment, and apparatus, shall be presented each year when the school budget is submitted to the respective tax-levying authorities. The boards of commissioners shall be given a reasonable time to provide the funds which they, upon investigation, shall find to be necessary for providing their respective units with buildings suitably equipped, and it shall be the duty of the several boards of county commissioners to provide funds for the same.

Upon determination by a local board of education that the existing permanent school building does not have sufficient classrooms to house the pupil enrollment anticipated for the school, the local board of education may acquire and use as temporary classrooms for the operation of the school, relocatable or mobile classroom units, whether built on the lot or not, which units and method of use shall meet the approval of the School Planning Division of the State Board of Education, and which units shall comply with all applicable requirements of the North Carolina State Building Code and of the local building and electrical codes applicable to the area in which the school is located. These units shall also be anchored in a manner required to assure their structural safety in severe weather. The acquisition and installation of these units shall be subject in all respects to the provisions of Chapter 143 of the General Statutes. The provisions of Chapter 87, Article 1, of the General Statutes, shall not apply to persons, firms or corporations engaged in the sale or furnishing to local boards of education and the delivery and installation upon school sites of classroom trailers as a single building unit or of relocatable or mobile classrooms delivered in less than four units or sections.

(c) The building of all new school buildings and the repairing of all old school buildings shall be under the control and direction of, and by contract with, the board of education for which the building and repairing is done. If a board of education is considering building a new school building to replace an existing school building, the board shall not invest any construction money in the new building unless it submits to the State Superintendent and the State Superintendent submits to the North Carolina Historical Commission an analysis that compares the cost and feasibility of building the new building and of renovating the existing building and that clearly indicates the desirability of building the new building. No board of education shall invest any money in any new building until it has (i) developed plans based upon a consideration of the State Board's facilities guidelines, (ii) submitted these plans to the State Board for its review and comments, and (iii) reviewed the plans based upon a consideration of the comments it receives from the State Board. No local board of education shall contract for more money than is made available for the erection of a new building. However, this subsection shall not be construed so as to prevent boards of education from investing any money in buildings that are being constructed pursuant to a continuing contract of construction as provided for in G.S. 115C-441 (a1). All contracts for buildings shall be in writing and all buildings shall be inspected, received, and approved by the local superintendent and the architect before full payment is made therefor. Nothing in this subsection shall prohibit boards of education from repairing and altering buildings with the help of janitors and other regular employees of the board.

In the design and construction of new school buildings and in the renovation of existing school buildings that are required to be designed by an architect or engineer under G. S. 133-1.1, the local board of education shall participate in the planning and review process of the Energy Guidelines for School Design and Construction that are developed and maintained by the Department of Public Instruction and shall adopt local energy-use goals for building design and operation that take into account local conditions in an effort to reduce the impact of operation costs on local and State budgets. In the design and construction of new school facilities and in the repair and renovation of existing school facilities, the local board of education shall consider the placement and design of windows to use the climate of North Carolina for both light and ventilation in case of power shortages. A local board shall also consider the installation of solar energy systems in the school facilities whenever practical.

In the case of any school building erected, repaired, or equipped with any money loaned or granted by the State to any local school administrative unit, the State Board of Education, under any rules as it may deem advisable, may retain any amount not to exceed fifteen percent (15%) of the loan or grant, until the completed buildings, erected or repaired, in whole or in part, from the loan or grant funds, shall have been approved by a designated agent of the State Board of Education. Upon approval by the State Board of Education, the State Treasurer may pay the balance of the loan or grant to the treasurer of the local school administrative unit for which the loan or grant was made.

(d) Local boards of education shall make no contract for the erection or repair of any school building unless the site upon which it is located is owned in fee simple by the board: Provided, that the board of education of a local school administrative unit, with the approval of the board of county commissioners may appropriate funds to aid in the establishment of a school facility and the operation thereof in an adjoining local school administrative unit when a written agreement between the boards of education of the administrative units involved has been reached and the same recorded in the minutes of the boards, whereby children from the administrative unit making the appropriations shall be entitled to attend the school so established.

In all cases where title to property has been vested in the trustees of a special charter district which has been abolished and has not been reorganized, title to the property shall be vested in the local board of education of the county embracing the former special charter district. (1955, c. 1372, art. 15, ss 5-7; 1969, c. 1022, s. 1;1981, c. 423, s. 1; c. 638, s. 1; 1983, c. 761, s. 93; 1985, c. 783, s. 3; 1987, c. 622, s. 14; 1993, c. 416, s. 1; c. 465, s. 1; 1993 (Reg. Sess., 1994), c. 775, s. 6; 1995, c. 8, s. 1.)

(e) The State Board of Education shall establish within the Department of Public Instruction a central clearinghouse for access by local boards of education that my want to use a prototype design in the construction of school facilities. The State Board shall compile necessary publications and a computer database to distribute information on prototype designs to local school administrative units. All architects and engineers registered in North Carolina may submit plans for inclusion in the computer database and these plans may be accessed by any person. The original architect of record or engineer of record shall retain ownership and liability for a prototype design. The State Board may adopt rules it considers necessary to implement this subsection.

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FEASIBILITY AND COST ANALYSIS AS REQUIRED BY G.S.115C-521

The 1993 session of the General Assembly of North Carolina passed House Bill 1001, "AN ACT TO ENCOURAGE LOCAL BOARDS OF EDUCATION TO RENOVATE OLD SCHOOL BUILDINGS INSTEAD OF REPLACING THEM." This Act modifies General Statute 115C-521. It requires that "If a board of education is considering building a new school building to replace an older school building, the board shall not invest any construction money in any new building unless they submit to the State Superintendent and the North Carolina Historical Commission an analysis that compares the cost and feasibility of building the new building and of renovating the existing building and that clearly indicates the desirability of building the new building."

FEASIBILITY AND COST ANALYSIS forms shall be submitted to School Planning, NCDPI for review along with the first submittal of plans for review, whenever a new project would replace an older school building. The address for submittal of plans and the analysis is as follows:

NCDPI, School Planning
NC Education Building, 7th Floor
301 N. Wilmington St.
Raleigh, NC 27601-2825
(919) 715-1990

The feasibility and cost analysis forms are provided as a guideline. Other formats may be used, but comparisons must be based on useful life and cost per student.

FORMS AND ASSISTANCE ARE AVAILABLE FROM SCHOOL PLANNING.

CLASS SIZES AND TEACHER ALLOTMENTS

State Regular Classroom Teacher Allotments (1996-97)

Grades	Teacher/Pupil Ratios
K-2	1:23
3-9	1:26
10-12	1:28.425

Maximum Legal Class Sizes (1995-96)

A class may exceed the **allotment** size by up to three students, provided the LEA average does not exceed the **allotment** (G.S. 115C - 301(c).

Pre-kindergarten Recommendations

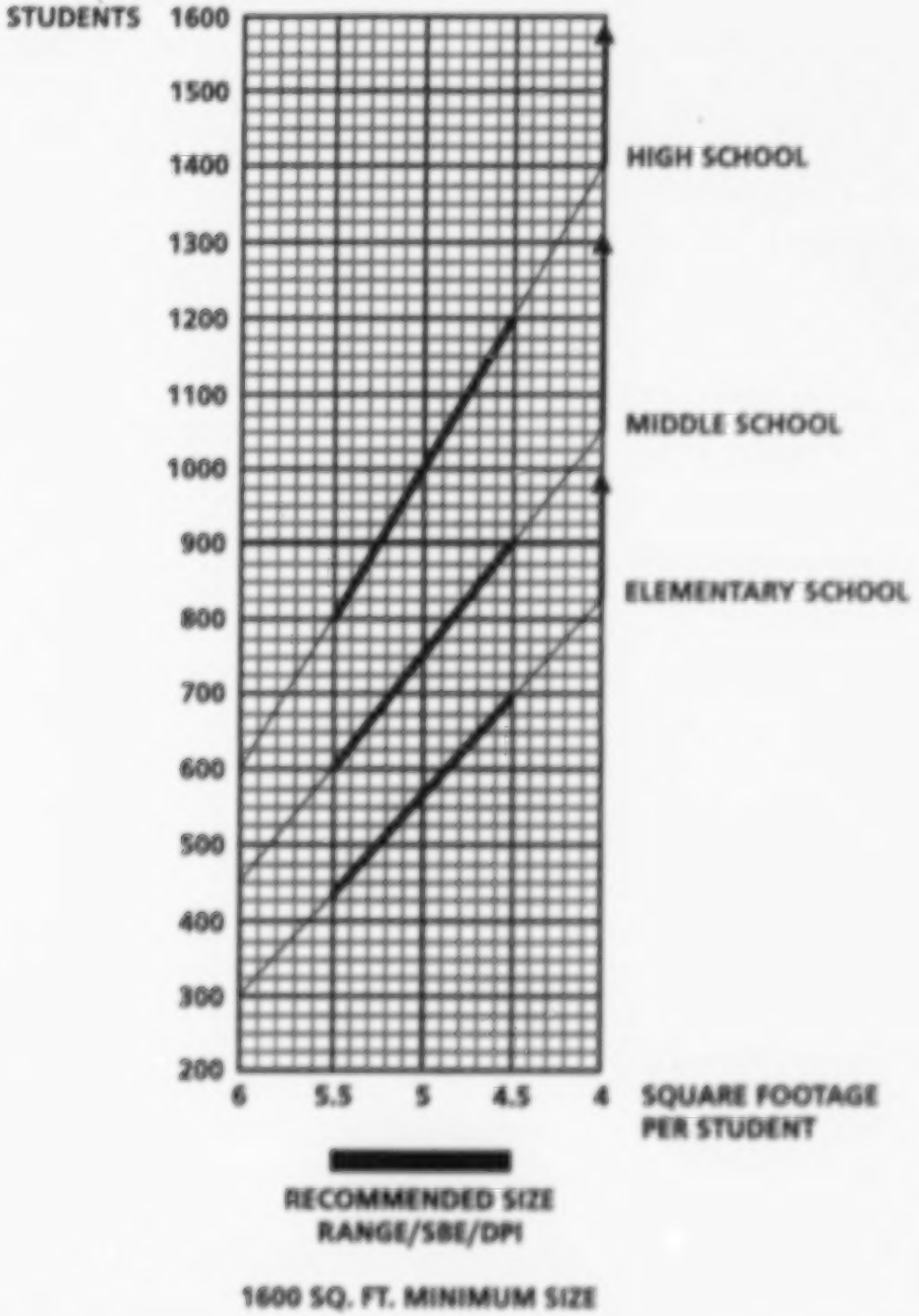
Grades	Teacher/Pupil Ratios
3 year old	1:8
4 year old	1:8 or 9

The maximum daily load for teachers teaching only in grades 7- 12 is 150 students. Current State Board policy establishes the maximum class size at 50 students in selected areas such as music, physical education and similar classes, with the exception of activities such as band and choral music. Keyboarding classes are now subject to normal class size limits.

The maximum legal class size is a guide for determining the number of toilet fixtures required (see NCSBC, Volume II Plumbing 407.2.4.2).

Teacher allotments are a good guide, in the absence of more accurate information, for determining the population of individual classrooms, designing furniture layouts, etc. Note that by the use of local funds, or through the flexibility in the ABCs of Public Education, many local administrative units may reduce class sizes significantly below these allotment ratios or increase certain class sizes up to the maximum legal class size.

SUGGESTED SIZING FOR MEDIA CENTER MAIN ROOMS



1600 SQ. FT. MINIMUM SIZE

Deviation from the North Carolina Public School Facility Guidelines

School Planning will evaluate plans for general compliance with the "Guidelines." Note that the "Guidelines" may not be applicable to facilities with non-traditional educational programs. Such facilities will be evaluated on the basis of their individual educational program. When deviations are identified during the review process, School Planning will prepare a "Deviation from the North Carolina Public School Facility Guidelines" form for inclusion in the permanent file for the individual school property, with a copy forwarded to the designer, and the local administrative unit. The completed form will describe the nature for the deviation. Deviations identified are available for reporting to the State Board of Education each quarter. Additional comments by School Planning may be submitted to the State Board along with the deviation form, if the issues are not clearly addressed.

The deviation form is on the following page.

Deviation from the
North Carolina Public Schools Facility Guidelines

Date:
Local Board of Education:
Designer:
School Facility & Project:

The items noted below are significantly less than the guidelines adopted in the "North Carolina Public Schools Facility Guidelines." The failure to construct facilities equal to or better than these guidelines may result in the inability to provide an effective educational program, reduced function of the facility, impaired performance of building systems or other significant problems.

A copy of this notice is being placed in the permanent file for this school facility.

	Guidelines	Amount Shown	Comments/Explanation
Site			
K Regular Classrooms	1300 sq. ft.		
1-3 Regular Classrooms	1000 sq. ft.		
4-8 Regular Classrooms	850 sq. ft.		
9-12 Regular Classrooms	750 sq. ft.		
Science Classrooms/Labs			
Exceptional Children			
Music			
Visual Arts			
Theater			
Dance			
Workforce Development			
Media Center			
Physical Education			
Staff Offices			
Circulation			
Other (Itemize)			

pc: _____ Board of Education
_____ Superintendent
_____ Designer
_____ Project File

RECOMMENDED LIGHTING SYSTEMS WITH ILLUMINATION LEVELS

INTERIOR LOCATIONS	MAINTAINED ILLUMINATION IN FOOT-CANDLES* MINIMUM	MAXIMUM	TYPE OF LIGHTING FIXTURES
AUDITORIUMS			
SEATING AREA	10	15	FLUORESCENT (DIMMING OR MULTIPLE SWITCHING)
STAGE SET-UP	20	30	FLUORESCENT
CONCERTS ON STAGE	50	75	FLUORESCENT
DRAMA WITH ACCENTS	VARIABLE	100	INCANDESCENT (TRACKS WITH DIMMING EQUIPMENT)
CAFETERIAS			
KITCHEN/SERVING AREA	50	75	FLUORESCENT
DINING ROOM	10	20	FLUORESCENT
CASHIERS	20	30	FLUORESCENT (TASK LIGHTING)
DISH WASHING	20	30	FLUORESCENT (LISTED FOR WET LOCATIONS)
CLASSROOMS			
GENERAL	50	75	FLUORESCENT
ART	50	75	FLUORESCENT
COMPUTER	50	75	FLUORESCENT (INDIRECT LIGHTING)
DRAFTING	75	100	FLUORESCENT
STUDY HALLS	50	75	FLUORESCENT
HOME ECONOMICS	50	75	FLUORESCENT
LABORATORIES			
GENERAL	50	75	FLUORESCENT
DEMONSTRATION	100	150	FLUORESCENT (TASK LIGHTING)
LIPREADING	100	150	FLUORESCENT
MUSIC	50	75	FLUORESCENT
SEWING	75	100	FLUORESCENT (TASK LIGHTING)
SHOPS	50	75	FLUORESCENT (HIGHER LEVELS MAY BE USED FOR DETAILED WORK)
TYPING	50	75	FLUORESCENT
CORRIDORS AND STAIRWELLS (USE REMOTE OR KEYED SWITCHING)			
MIDDLE AND HIGH	20	30	FLUORESCENT
ELEMENTARY	10	15	FLUORESCENT
TROPHY CASES	50	75	COMPACT FLUORESCENT
WALL "WASHING"	MIN. AMOUNTS		COMPACT FLUORESCENT
GYMNASIUMS - MULTIPLE SWITCHING TO OBTAIN VARIOUS LEVELS - COMPETITION GAMES VERSUS PHYSICAL EDUCATION)			
COMPETITION BETWEEN SCHOOLS	30	50	METAL HALIDE
PHYSICAL EDUCATION	20	30	METAL HALIDE
LOCKERS AND SHOWERS	20	30	FLUORESCENT (LISTED FOR WET LOCATIONS)
ELEMENTARY (MULTIPURPOSE)	20	30	METAL HALIDE OR FLUORESCENT
MECHANICAL, ELECTRICAL & BOILER ROOMS	30	50	FLUORESCENT (INDUSTRIAL FIXTURES) OR INCANDESCENT IF ON WHILE "TEMPORARILY" OCCUPIED

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INTERIOR LOCATIONS	MAINTAINED ILLUMINATION IN FOOT-CANDLES* MINIMUM	MAXIMUM	TYPE OF LIGHTING FIXTURES
MEDIA CENTERS			
READING ROOM, CHECK IN/OUT, CARD	50	75	FLUORESCENT
FILES	30	50	FLUORESCENT
BOOK STACKS, MAGAZINE RACKS	50	75	FLUORESCENT
OFFICE AREAS	7.5	10	FLUORESCENT
AV AND OTHER STORAGE	75	100	FLUORESCENT (TASK LIGHTING)
AV REPAIR			
OFFICES			
GENERAL OFFICE WORK	75	100	FLUORESCENT
CLOSE WORK	100	150	FLUORESCENT (TASK LIGHTING)
TEACHER WORKROOM	30	50	FLUORESCENT
CONFERENCE ROOM	30	50	FLUORESCENT
STORAGE ROOMS, PIPE CHASES, ATTICS, CRAWL SPACES	7.5	10	FLUORESCENT (OR INCANDESCENT IF ON "TEMPORARILY" WHILE OCCUPIED)
SWIMMING POOLS	7.5	10	METAL HALIDE OR FLUORESCENT (LISTED FOR WET LOCATION)
WASHROOMS/GROUP TOILETS	20	30	FLUORESCENT (USE REMOTE OR KEYED SWITCHING)
WASHROOMS/FACULTY TOILETS	10	15	FLUORESCENT

EXTERIOR LOCATIONS (ALL FIXTURES SHALL BE LISTED FOR WET LOCATIONS AND OUTDOOR USE)

BUILDING EXTERIOR (FOR SECURITY PURPOSES)	1	1 1/2	HIGH PRESSURE SODIUM OR METAL HALIDE
PARKING LOTS AND WALKWAYS	1	1 1/2	HIGH PRESSURE SODIUM OR METAL HALIDE (COMPACT FLUORESCENT MAY BE USED FOR WALKWAYS)
SPORTS COMPLEXES**			
SOCCER/FOOTBALL STADIUM	30	50	METAL HALIDE
BADMINTON/VOLLEYBALL/TENNIS COURTS	20	30	METAL HALIDE
BASEBALL/SOFTBALL			
OUTFIELD			METAL HALIDE
INFIELD	15	30	METAL HALIDE
SEPARATE RUNNING TRACKS	20	50	
(NOT A PART OF A FOOTBALL OR BASEBALL STADIUM)	15	15	METAL HALIDE
**REFER TO NCHSAA FOR THEIR REQUIREMENTS			

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*BASED ON IES RECOMMENDATIONS

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